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CLEAN VERSION OF THE DESIGNATED PARAGRAPHS

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Automobile and truck engines typically have their valve train components covered with covers designed to protect the valves and internal components from a variety of external contaminants and to contain engine oil and combustion gases within the engine for proper disposal. These covers are variously referred to as valve covers, rocker covers, cam covers and the like. Traditionally these valve covers have been made from metal materials such as steel, magnesium, or aluminum. Recently, in order to reduce cost and weight, valve covers have been made from thermoset plastic materials or thermoplastic materials which can withstand the high underhood temperature environment, see for example, US Patent 5,492,086 US Patent 5,375,569, US Patent 5,746,168 and US Patent 5,636,759. Typically the valve covers are attached to the engine by bolting the valve cover to the cylinder head. In order to seal the internal engine components from the outside environment and contain engine oil and combustion gases a gasket is disposed between the valve cover and the cylinder head.

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Furthermore, the adhesive must be able to withstand exposure to hydrocarbon materials, engine oil, calcium chloride, brake fluid, glycol coolants, windshield washer solvents and the like, at the above-mentioned temperatures and the pressures to which the internal combustion engine reaches internally. The adhesive must be able to bond to the material used to make the valve cover and to the material from which cylinder heads are prepared, such as, cast iron, aluminum and magnesium. The adhesive used is a structural adhesive which is an adhesive which has sufficient cohesive strength to hold the valve cover in place during normal operating conditions. Preferably, the cohesive strength measured in Lap Shear mode according to ASTM D3165-91 or in tensile mode according to ASTM D638 Type 4 is 250 psi (1724 kPa) or greater, more preferably 500 (3447 kPa) or greater and most preferably 1000 psi (6895 kPa) or greater. The adhesive used can be cured via a variety of known mechanisms including heat cure, infrared cure, ultraviolet cure, chemical cure, solvent loss and moisture cure. In another

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embodiment the adhesive can be a cure-on-demand adhesive which requires a separate operation to cause the adhesive to begin to cure. In one embodiment this is achieved by using an encapsulated curing agent which needs to be ruptured. In another embodiment this is achieved by removing a protective coating to expose the adhesive to ambient conditions. Cure can be initiated by exposing the adhesive to heat, infrared or ultraviolet light sources, or to shearing forces and the like. Preferably the adhesive is a high temperature epoxy resin, a polyimide, a hybrid polyimide/epoxy resin adhesive, a silicone, a fluorosilicone, an alkylborane initiated acrylic adhesive system, or an epoxy novolac/nitrile rubber adhesive High temperature adhesive means an adhesive which when cured can withstand exposure to the temperatures mentioned above without decomposing or delaminating from the substrate.

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Figure 8 shows a two part valve cover (40) where the upper portion (41) can be separated from the lower portion (42) to allow access to enclosed engine parts. Figure 9 shows an exploded view of the two piece valve cover (40) and the engine head (43). Shown is the upper portion (41) of the valve cover (40) having a female opening (45) which is located about the entire perimeter of the upper portion (41) of the valve cover (40) and adapted to receive the male protrusion (44) of the lower portion (42) of the valve cover (40). The male protrusion (44) extends about the perimeter of the lower portion (42) of the valve cover (40). The female opening (45) has indentations (46) perpendicular to the indentation of the female opening (45) adapted to receive perpendicular protrusions (47) on the male protrusion (44) of the lower portion of the valve cover (42). The perpendicular protrusions (47) are perpendicular to the direction of the male protrusion (44). The indentations (46) and the perpendicular protrusions (47) serve to lock the upper portion (41) of the valve cover (40) to the lower portion (42) of the valve cover (40). Also illustrated is the area where adhesive is to be applied (49). Figure 10 shows the two-part valve cover (40) attached to the engine head (43) using an adhesive (49). Figure 10 also shows the upper portion (41) and the lower portion (42) of the valve cover (40) assembled wherein the male protrusion (44) of the lower portion (42) is located within the female opening (45) of the upper portion (41) and locked by the

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perpendicular protrusions (47) of the male protrusion (44) being located in the indentations (46) of the female opening (45).